V-I CHARACTERISTICS PLOTTER

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Abstract - In this paper we analyze and plot the VI Characteristics graph of various electronic devices using graphical user interface (GUI). In this project voltage sensor and current sensor are used to measure input voltage and current in the circuit. This measured voltage and current converted into digital form using Arduino. The digital output of Arduino is given to the computer to plot the characteristics graph with the help of GUI. We can measure various electronic device characteristics on a single kit with the help of this project. This project can be used at the institute for performing the experiments of various electronic device characteristics.

Keywords – Characteristics; GUI; Voltage sensor; current sensor; Arduino.

Introduction

To measure VI Characteristics of device different circuit arrangement is required for different device, we have to take reading for every change in voltage so this is lengthy and difficult procedure to plot the graph. In this project we can plot the Characteristics graph with the help of graphical user interface on the computer screen, this it is easy to understand and we can measure the current flowing through device by varying the input voltage manually. Students can easily differentiate and understand the VI characteristics of different electronics device. Graphical representation will help to observe changes in output current in accordance with input voltage in real time. There is no different circuit arrangement required to measure characteristics for each device. We can measure the V-I characteristics of device such as MOSFET, BJT, Diode, SCR, TRIAC, UJT, etc.

Block Diagram

A DC power supply which provides a constant DC voltage to its load. A DC power supply me be powered from an AC source. This power supply can provide voltage up to 30 V. the voltage is given to the device of which characteristics has to be plotted and the voltage is need to increase manually up to certain value.

The block diagram for measurement and plot the graph is shown below in which Arduino is used to measure the voltage and current.
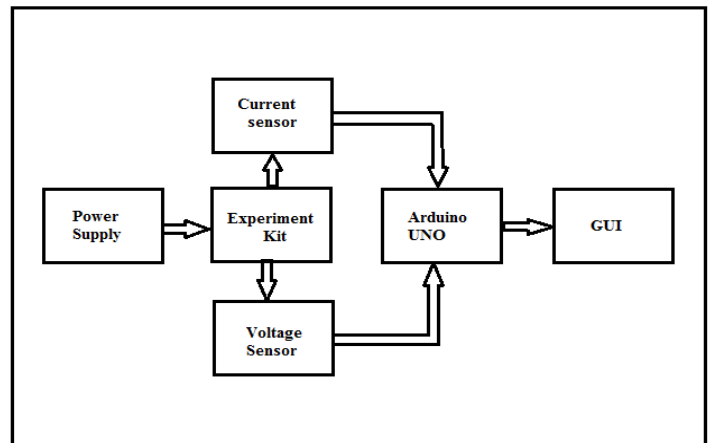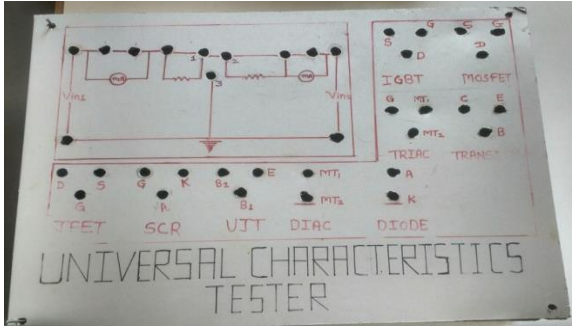

Methodology

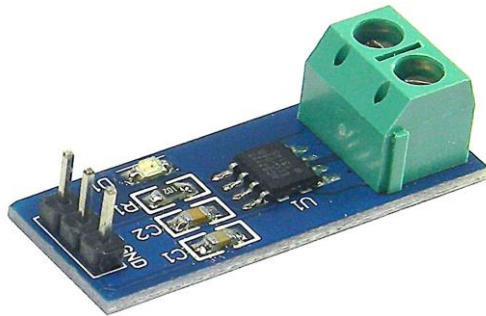## Power Supply

Experiment Kit

This experiment kit consists of different devices mounted on PCB and banana switches are provided to connect the particular device to power supply. The sockets are provided to measure the output current of the device which is under experiment.
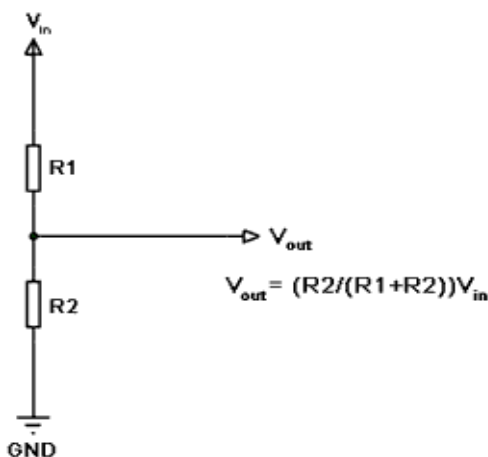
Current Sensor

In this project current sensor ACS 712 is used to measure the output current. This sensor can measure AC and DC current, it operates on 5V DC power supply having sensitivity of 185 mv/A. This current sensor is offered with full scale value of 5A.

Voltage measurement

Voltage Divider Circuit:

Above shown voltage divider circuit is used to measure the voltage with the help of Arduino. It uses two resistors R1 and R2 which are of 10K and 100K ohm. These registers form a voltage divider circuit. The output is taken from the midpoint and given to an analog input of the Arduino.

Arduino UNO

The Adriano UNO is micro-controller board based on the ATmega328P micro-controller. In this project the Arduino is used to measure input voltage and current flowing through particular device and gives digital output.[2] Which is given to the computer with the help of this output graph will be plotted.

GUI

GUI means graphical user interface, it is a type of user interface that will provide the users to interact with graphical icons and visual indicators. In this project GUI is used to plot the graph of VI characteristics using digital values obtained from Arduino. [1]

Conclusion

We can plot a graph for VI charactristics of different electronics devices using a single kit. We can observe the change in current with respect to input voltage graphically. This kit can be used in institues for performing the experiments.

References

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